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## RAW SEQUENCE LISTING

PATENT APPLICATION: US/10/071,505

DATE: 03/01/2002

TIME: 14:11:53

Input Set : A:\Pb99441.app

Output Set: N:\CRF3\03012002\J071505.raw

3 <110> APPLICANT: Davis, Maria  
4 Nelson, John  
5 Kumar, Shiv  
6 Finn, Patrick J.  
7 Nampalli, Satyam  
8 Flick, Parke  
10 <120> TITLE OF INVENTION: TAQ DNA Polymerase Having an Amino Acid Substitution at  
11 E681 and Homologs Thereof Exhibiting Improved Salt  
12 Tolerance  
14 <130> FILE REFERENCE: PB9944  
C--> 16 <140> CURRENT APPLICATION NUMBER: US/10/071,505  
C--> 17 <141> CURRENT FILING DATE: 2002-02-08  
19 <150> PRIOR APPLICATION NUMBER: 60/148,012  
20 <151> PRIOR FILING DATE: 1999-08-10  
22 <160> NUMBER OF SEQ ID NOS: 3  
24 <170> SOFTWARE: PatentIn Ver. 2.1  
26 <210> SEQ ID NO: 1  
27 <211> LENGTH: 832  
28 <212> TYPE: PRT  
29 <213> ORGANISM: Thermus aquaticus  
31 <400> SEQUENCE: 1  
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35 Val Asp Gly His His Leu Ala Tyr Arg Thr Phe His Ala Leu Lys Gly  
36 20 25 30  
38 Leu Thr Thr Ser Arg Gly Glu Pro Val Gln Ala Val Tyr Gly Phe Ala  
39 35 40 45  
41 Lys Ser Leu Leu Lys Ala Leu Lys Glu Asp Gly Asp Ala Val Ile Val  
42 50 55 60  
44 Val Phe Asp Ala Lys Ala Pro Ser Phe Arg His Glu Ala Tyr Gly Gly  
45 65 70 75 80  
47 Tyr Lys Ala Gly Arg Ala Pro Thr Pro Glu Asp Phe Pro Arg Gln Leu  
48 85 90 95  
50 Ala Leu Ile Lys Glu Leu Val Asp Leu Leu Gly Leu Ala Arg Leu Glu  
51 100 105 110  
53 Val Pro Gly Tyr Glu Ala Asp Asp Val Leu Ala Ser Leu Ala Lys Lys  
54 115 120 125  
56 Ala Glu Lys Glu Gly Tyr Glu Val Arg Ile Leu Thr Ala Asp Lys Asp  
57 130 135 140  
59 Leu Tyr Gln Leu Leu Ser Asp Arg Ile His Val Leu His Pro Glu Gly  
60 145 150 155 160  
62 Tyr Leu Ile Thr Pro Ala Trp Leu Trp Glu Lys Tyr Gly Leu Arg Pro  
63 165 170 175

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65 Asp Gln Trp Ala Asp Tyr Arg Ala Leu Thr Gly Asp Glu Ser Asp Asn
66      180      185      190
68 Leu Pro Gly Val Lys Gly Ile Gly Glu Lys Thr Ala Arg Lys Leu Leu
69      195      200      205
71 Glu Glu Trp Gly Ser Leu Glu Ala Leu Leu Lys Asn Leu Asp Arg Leu
72      210      215      220
74 Lys Pro Ala Ile Arg Glu Lys Ile Leu Ala His Met Asp Asp Leu Lys
75 225      230      235      240
77 Leu Ser Trp Asp Leu Ala Lys Val Arg Thr Asp Leu Pro Leu Glu Val
78      245      250      255
80 Asp Phe Ala Lys Arg Arg Glu Pro Asp Arg Glu Arg Leu Arg Ala Phe
81      260      265      270
83 Leu Glu Arg Leu Glu Phe Gly Ser Leu Leu His Glu Phe Gly Leu Leu
84      275      280      285
86 Glu Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly
87      290      295      300
89 Ala Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp
90 305      310      315      320
92 Leu Leu Ala Leu Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro
93      325      330      335
95 Glu Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu
96      340      345      350
98 Ala Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro
99      355      360      365
101 Pro Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn
102      370      375      380
104 Thr Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu
105 385      390      395      400
107 Glu Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu
108      405      410      415
110 Trp Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu
111      420      425      430
113 Val Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly
114      435      440      445
116 Val Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala
117      450      455      460
119 Glu Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His
120 465      470      475      480
122 Pro Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp
123      485      490      495
125 Glu Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg
126      500      505      510
128 Ser Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile
129      515      520      525
131 Val Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr
132      530      535      540
134 Tyr Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu
135 545      550      555      560
137 His Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser

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140 Ser Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln
141                               580                               585                               590
143 Arg Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala
144                               595                               600                               605
146 Leu Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly
147                               610                               615                               620
149 Asp Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr
150 625                               630                               635                               640
152 Glu Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro
153                               645                               650                               655
155 Leu Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly
156                               660                               665                               670
158 Met Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu
159                               675                               680                               685
161 Ala Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg
162                               690                               695                               700
164 Ala Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Gly Tyr Val
165 705                               710                               715                               720
167 Glu Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg
168                               725                               730                               735
170 Val Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro
171                               740                               745                               750
173 Val Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu
174                               755                               760                               765
176 Phe Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His
177                               770                               775                               780
179 Asp Glu Leu Val Leu Glu Ala Pro Lys Glu Arg Ala Glu Ala Val Ala
180 785                               790                               795                               800
182 Arg Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro
183                               805                               810                               815
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192 <210> SEQ ID NO: 2
193 <211> LENGTH: 560
194 <212> TYPE: PRT
195 <213> ORGANISM: Thermus aquaticus
197 <400> SEQUENCE: 2
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201 Leu Glu Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu
202 20 25 30
204 Gly Ala Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala
205 35 40 45
207 Asp Leu Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala
208 50 55 60
210 Pro Glu Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu
211 65 70 75 80
213 Leu Ala Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu

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214				85				90				95				
216	Pro	Pro	Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu	Asp	Pro	Ser
217				100				105				110				
219	Asn	Thr	Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr
220				115				120				125				
222	Glu	Glu	Ala	Gly	Glu	Arg	Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn
223				130				135				140				
225	Leu	Trp	Gly	Arg	Leu	Glu	Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg
226	145							150				155				160
228	Glu	Val	Glu	Arg	Pro	Leu	Ser	Ala	Val	Leu	Ala	His	Met	Glu	Ala	Thr
229								165				170				175
231	Gly	Val	Arg	Leu	Asp	Val	Ala	Tyr	Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val
232								180				185				190
234	Ala	Glu	Glu	Ile	Ala	Arg	Leu	Glu	Ala	Glu	Val	Phe	Arg	Leu	Ala	Gly
235								195				200				205
237	His	Pro	Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	Val	Leu	Phe
238								210				215				220
240	Asp	Glu	Leu	Gly	Leu	Pro	Ala	Ile	Gly	Lys	Thr	Glu	Lys	Thr	Gly	Lys
241	225							230				235				240
243	Arg	Ser	Thr	Ser	Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu	Ala	His	Pro	
244								245				250				255
246	Ile	Val	Glu	Lys	Ile	Leu	Gln	Tyr	Arg	Glu	Leu	Thr	Lys	Leu	Lys	Ser
247								260				265				270
249	Thr	Tyr	Ile	Asp	Pro	Leu	Pro	Asp	Leu	Ile	His	Pro	Arg	Thr	Gly	Arg
250								275				280				285
252	Leu	His	Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	Arg	Leu	Ser
253								290				295				300
255	Ser	Ser	Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	Pro	Leu	Gly
256	305							310				315				320
258	Gln	Arg	Ile	Arg	Arg	Ala	Phe	Ile	Ala	Glu	Glu	Gly	Trp	Leu	Leu	Val
259								325				330				335
261	Ala	Leu	Asp	Tyr	Ser	Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	His	Leu	Ser
262								340				345				350
264	Gly	Asp	Glu	Asn	Leu	Ile	Arg	Val	Phe	Gln	Glu	Gly	Arg	Asp	Ile	His
265								355				360				365
267	Thr	Glu	Thr	Ala	Ser	Trp	Met	Phe	Gly	Val	Pro	Arg	Glu	Ala	Val	Asp
268								370				375				380
270	Pro	Leu	Met	Arg	Arg	Ala	Lys	Thr	Ile	Asn	Tyr	Gly	Val	Leu	Tyr	
271	385							390				395				400
273	Gly	Met	Ser	Ala	His	Arg	Leu	Ser	Gln	Arg	Leu	Ala	Ile	Pro	Tyr	Glu
274								405				410				415
276	Glu	Ala	Gln	Ala	Phe	Ile	Glu	Arg	Tyr	Phe	Gln	Ser	Phe	Pro	Lys	Val
277								420				425				430
279	Arg	Ala	Trp	Ile	Glu	Lys	Thr	Leu	Glu	Glu	Gly	Arg	Arg	Arg	Gly	Tyr
280								435				440				445
282	Val	Glu	Thr	Leu	Phe	Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp	Leu	Glu	Ala
283								450				455				460
285	Arg	Val	Lys	Ser	Val	Glu	Ala	Ala	Glu	Arg	Met	Ala	Phe	Asn	Met	Pro
286	465							470				475				480

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288 Val Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu
289           485           490           495
291 Phe Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His
292           500           505           510
294 Asp Glu Leu Val Leu Glu Ala Pro Lys Glu Arg Ala Glu Ala Val Ala
295           515           520           525
297 Arg Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro
298           530           535           540
300 Leu Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu
301 545           550           555           560
307 <210> SEQ ID NO: 3
308 <211> LENGTH: 830
309 <212> TYPE: PRT
310 <213> ORGANISM: Thermus aquaticus
312 <400> SEQUENCE: 3
313 Met Arg Gly Met Leu Pro Leu Phe Glu Pro Lys Gly Arg Val Leu Leu
314 1           5           10           15
316 Val Ala Gly His His Leu Ala Tyr Arg Thr Phe His Ala Leu Lys Gly
317           20           25           30
319 Leu Thr Thr Ser Arg Gly Glu Pro Val Gln Ala Val Tyr Gly Phe Ala
320           35           40           45
322 Lys Ser Leu Leu Lys Ala Leu Lys Glu Asp Gly Asp Ala Val Ile Val
323           50           55           60
325 Val Phe Asp Ala Lys Ala Pro Ser Phe Arg His Glu Ala Tyr Gly Gly
326 65           70           75           80
328 Tyr Lys Ala Gly Arg Ala Pro Thr Pro Glu Asp Phe Pro Arg Gln Leu
329           85           90           95
331 Ala Leu Ile Lys Glu Leu Val Asp Leu Leu Gly Leu Ala Arg Leu Glu
332           100          105          110
334 Val Pro Gly Tyr Glu Ala Asp Asp Val Leu Ala Ser Leu Ala Lys Lys
335           115          120          125
337 Ala Glu Lys Glu Gly Tyr Glu Val Arg Ile Leu Thr Ala Asp Lys Asp
338           130          135          140
340 Leu Tyr Gln Leu Leu Ser Asp Arg Ile His Val Leu His Pro Glu Gly
341 145          150          155          160
343 Tyr Leu Ile Thr Pro Ala Trp Leu Trp Glu Lys Tyr Gly Leu Arg Pro
344           165          170          175
346 Asp Gln Trp Ala Asp Tyr Arg Ala Leu Thr Gly Asp Glu Ser Asp Asn
347           180          185          190
349 Leu Pro Gly Val Lys Gly Ile Gly Glu Lys Thr Ala Arg Lys Leu Leu
350           195          200          205
352 Glu Glu Trp Gly Ser Leu Glu Ala Leu Leu Lys Asn Leu Asp Arg Leu
353           210          215          220
355 Lys Pro Ala Ile Arg Glu Lys Ile Leu Ala His Met Asp Asp Leu Lys
356 225          230          235          240
358 Leu Ser Trp Asp Leu Ala Lys Val Arg Thr Asp Leu Pro Leu Glu Val
359           245          250          255
361 Asp Phe Ala Lys Arg Arg Glu Pro Asp Arg Glu Arg Leu Arg Ala Phe
362           260          265          270

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VERIFICATION SUMMARY

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L:17 M:271 C: Current Filing Date differs, Replaced Current Filing Date